



**UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

A-S

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
-----------------	-------------	----------------------	---------------------

09/002,007 12/31/97 HUNG

J 015290-238

IM62/0825

JAMES W PETERSON
BURNS DOANE SWECKER AND MATHIS
P O BOX 1404
ALEXANDRIA VA 22313-1404

EXAMINER

VINH, L

ART UNIT

PAPER NUMBER

1765

DATE MAILED:

08/25/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/002,007

Applicant(s)
Jeffrey Hung et al.

Examiner
Lan Vinh

Group Art Unit
1765



☒ Responsive to communication(s) filed on Jul 21, 1998

☐ This action is FINAL.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-21 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-21 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 4,5,7

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit: 1765

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14 recites the limitation "oxygen-free plasma etching gas formulation" in line 1.

There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1765

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4, 6, 8, 9, 10-12, 14-17, 19, 20 are rejected under 35 U.S.C 103(a) as being unpatentable over Hsue et al. (US 5,554,560) in view of Shan et al. (US 5,514,247).

Hsue discloses a method for forming a planar field oxide on substrate for integrated circuit comprising: patterning a silicon nitride layer using photolithographic techniques to leave portions of the silicon nitride layer over the device areas (Col 4, lines 1-5), forming the polysilicon gate electrodes (conducting layer) and other patterned conducting layers (Col 5, lines 46-49), depositing a leveling layer of organic anti-reflective coating composed of a polymer (Col 4, lines 56-57), etching the organic ARC layer in a reactive ion etcher using a gas mixture of CHF_3 , CF_4 and Argon at a operating pressure of between about 50 to 150 milliTorr and at a RF power of 300 watts (Col 5, lines 20-29).

Regarding claims 16, 19 , although Hsue does not specifically recite using polyimide as an organic ARC, it is commonly known in the art of IC lithographic patterning that polyimide is an organic polymer ARC as evidenced by Ta (US 5,308,742).

Regarding claim 10, it is known in the art of plasma etching that a reactive ion etcher includes a chamber, an antenna outside mounted on the outer surface of the insulating member, a quartz glass insulating member and RF current is supplied to the antenna to form plasma in the chamber as evidenced by Ishii (US 5,529,657).

Art Unit: 1765

Unlike the instant claimed invention, Hsue does not disclose the use of chlorine in the plasma etching gas mixture for etching the organic ARC layer (dielectric)

Shan teaches that flow ranges of about 5 to 25 sccm of gases such as Cl_2 , HCl are added to the basic dielectric etch gas mixture to form volatile compound with the underlying metal.

Hence, one skilled in the art would have found it obvious to modify Hsue's plasma etching gas mixture by adding chlorine to the etching gas mixture as per Shan because chlorine helps to dissociate C-F bonds in the dielectric etch process chemistry and remove polymer residue at the surface of silicon exposed upon etching through the dielectric layer.

6. Claims 5, 7, 13, 18, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsue et al. (US 5,554,560) in view of Shan et al. (US 5,514,247) and further in view of the following:

Hsue as modified by Shan , has been described above, fails to specifically disclose the following aspects of applicant's claimed invention: the specific ranges of pressure, temperature and gas flow rates claimed by the applicant.

However, it would have been obvious to employ any of a variety of ranges of pressure, temperature, gas flow rates because these are well known variables in the art of plasma etching which are known to effect both the rate and quality of the plasma etching process. Further, the selection of particular values for these variables would simply involve routine experimentation and

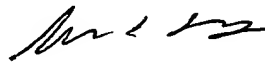
Art Unit: 1765

would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ta (US 5,308,742) , Ishii (US 5,529,657).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is (703) 305-6302.


BENJAMIN UTECH
PRIMARY EXAMINER
GROUP 1100

LV

August 16, 1999